



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,876	02/24/2004	Vijay D. Parkhe	008850	1903
61285	7590	10/03/2008	USA/CPI/COPPER/PIS	
JANAH & ASSOCIATES, P.C. 650 DELANCEY STREET, SUITE 106 SAN FRANCISCO, CA 94107				
EXAMINER				
MOORE, KARLA A				
ART UNIT		PAPER NUMBER		
1792				
MAIL DATE		DELIVERY MODE		
10/03/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/786,876

Applicant(s)

PARKHE ET AL.

Examiner

KARLA MOORE

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5, 6, 12, 14-16, 18-20 and 61-63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5, 6, 12, 14-16, 18-20 and 61-63 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Previous Amendment

1. The declarations filed under 37 CFR 1.132 have been reconsidered.
2. The declarations filed under 37 CFR 1.132 on 20 December 2006 appear to be insufficient to overcome the rejection of claims 12, 14, 17 and 19 based upon U.S. Patent Publication 2004/0055709 to Boyd, as set forth below, because: in retrospect, sufficient evidence has not been provided in order to establish that the disclosure of Boyd et al. is (or arose from) Applicant's own work (via 1.132 affidavit or declaration), nor, has a showing of conception by the Applicant before the filing date of the references been provided (via 1.131 affidavit or declaration), as needed. MPEP 2136 sets forth that a showing that the disclosure of a reference is Applicant's own work can be made by proving that the patentee, or the inventor(s) of the U.S. Patent Pubs was associated with Applicant (e.g. worked for the same company) and learned of applicant's invention from applicant via a 1.132 affidavit or declaration. In the instant case, Examiner notes that Boyd et al. has a different inventive entity. In fact, it does not even have a single inventor in common and no statement has been made that satisfies the above requirement. It appears that further evidence is needed to establish that Boyd et al. is not proper prior art under 102e.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 1792

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 58, 61-63 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 58 recites the limitation "a metal containing layer between *the dielectric* and the coating of the mesas". There is insufficient antecedent basis for this limitation in the claim. Examiner has assumed that the recitation was meant to read "a metal containing layer between the ceramic support structure and the coating of the mesas". Applicant is invited to correct and/or clarify the recitation. Further, with respect to the clarity of claim 58 (and those claims dependent thereon), there are two "a contact surface" recited. Examiner has examined the claims under the assumption that the coating itself is provided with a single "contact surface" which contacts a substrate supported by the substrate support. Again, Applicant is invited to correct and/or clarify the claim language.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 12, 14, 17 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Publication No. 2004/0055709 A1 to Boyd et al.
8. The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.
9. Boyd et al. disclose a substrate support comprising: a ceramic dielectric (102) comprising an embedded electrode (110); and a plurality of mesas (Figures 3 and 4) on the dielectric, the mesas comprising a coating of diamond-like carbon material over a titanium layer (paragraphs 2 and 30). The diamond-like carbon coating comprises a coefficient of friction of less than about 0.3 and a hardness of at least about 8 Gpa and a thickness of from about 1 to about 20 microns (paragraph 27).
10. With respect to claim 19, the ceramic structure comprises AlN or Al₂O₃ (paragraph 29).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 12, 14-15, 19 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,583,736 to Anderson et al. in view of U.S. Patent No. 5,969,934 to Larsen and U.S. Patent No. 7,160,616 to Massler et al.

14. Regarding claims 12 and 58: Anderson et al. disclose a substrate support substantially as claimed and comprising: (a) a ceramic substrate support structure (Figures 1 and 3, 11); and (b) a coating (21) on the support structure comprising a plurality of mesas (19), whereby the contact surface of the coating is capable of reducing abrasion and contamination of a substrate that contacts the surface (column 3, row 65 through column 4, row 12 and column 4, row 66 through column 5, row 5). The substrate support of Anderson is a known-in the art electrostatic substrate support that is provided with a tough and wear resistant contact surface (for example, column 6, rows 26-43). Anderson discloses an example of how the electrode (metallic base/body), ceramic and dielectric of the electrostatic chuck may be arranged with

respect to one another, but also states that other means of attachment/arrangement may be used (column 6, rows 8-26).

15. However, Anderson et al. fails to explicitly an electrostatic substrate support structure specifically constructed as a ceramic comprising an electrode embedded therein, as is conventionally known in the art and/or with a diamond-like carbon coating contact surface.

16. Larsen et al. does however provide such a teaching. In Larsen, an electrostatic substrate support comprising a ceramic with an electrode embedded therein is provided for the purpose of electrostatically clamping a substrate in a vacuum processing chamber as is conventionally known (Figures 1-4; abstract and column 4, row 6 through column 5, row 25). Larsen et al. also teaches the provision of a dielectric coating (e.g. diamond-like carbon) contact surface with a low friction, high hardness forming the substrate clamping surface for the purpose of lowering friction between the clamping surface of the substrate support and the substrate to be processed and for the purpose of providing a relatively hermetic seal over the insulating ceramic structure (column 3, rows 23-43 and column 7, row 12 through column 8, row 3).

17. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an electrostatic substrate support comprising a ceramic with an electrode embedded therein and a diamond-like carbon coating contact surface thereon in Anderson et al. in order to electrostatically clamp a substrate in a vacuum processing chamber while at the same time lowering friction between the clamping surface of the substrate support and the substrate to be

Art Unit: 1792

processed and also providing a relatively hermetic seal over the insulating ceramic structure as taught by Larsen.

18. Anderson and Larsen et al. disclose the invention substantially as claimed and as described above.

19. However, Anderson and Larsen et al. fail to teach specific properties and characteristics for the diamond-like carbon coating, for example, the coating comprising a carbon-hydrogen network, and the coating having a contact surface comprising a coefficient of friction of less than about 0.3 and a hardness of at least about 8 GPa.

20. Massler et al. teach providing a coating of diamond-like carbon (DLC) with a coefficient friction of less than about 0.3 and a hardness of at least about 8 Gpa on a structure/substrate where wear protection, corrosion protection and improvement of slipping properties and the like are of importance (abstract and column 20, about rows 16-48).

21. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided the coating comprising a DLC coating with a coefficient friction of less than about 0.3 and a hardness of at least about 8 Gpa on the substrate support in Anderson and Larsen et al. in order to impart wear protection, corrosion protection and improvement of slipping properties and the like as taught by Massler et al.

22. Massler et al. further disclose the provision of a titanium metal-containing adhesion layer (i.e. adhesion layer) below the diamond-like carbon coating for the

Art Unit: 1792

purpose of providing a DLC coating with excellent adhesion (column 3, rows 47-56 and column 4, rows 21-30).

23. With respect to claims 14 and 15, the coating of Massler et al. comprises a thickness of from about 1 to about 20 microns and the titanium layer comprises a thickness from about 0.25 microns to about 4 microns (column 5, rows 16-21).

24. With respect to claim 19, Larsen et al. disclose the ceramic structure comprises AlN or Al₂O₃ or other ceramic materials with high dielectric strength and high permittivity and that do not exhibit bulk polarization at the frequency and voltage used for clamping (column 4, rows 60-65 and column 5, rows 15-17).

25. Claims 5-6, 16 and 18, 20, 61-63 are rejected under 35 U.S.C. 103(a) as being unpatentable Anderson et al. and Massler et al. as applied to claims 1, 7-10, 12, 14-15, 19 and 58 above, and further in view of U.S. Patent No. 5,352,493 to Dorfman et al.

26. Regarding claims 5-6 and 16, 18, 20 and 61-63: Anderson et al. and Massler et al. disclose the substrate support substantially as claimed and as described above.

27. However, Anderson et al. and Massler et al. fail to teach the diamond-like material comprises a diamond-like nanocomposite having networks of (i) carbon and hydrogen and (ii) silicon and oxygen and/or providing the diamond-like material comprising from about 0.1 atom % to about 10 atom % of a metal additive.

28. Dorfman et al. teach providing diamond-like nanocomposite having networks of (i) carbon and hydrogen and (ii) silicon and oxygen as a protective film for the purpose

of providing a coating having high strength and microhardness, flexibility, low coefficient of friction, and high thermal and chemical stability (abstract).

29. Dorfman et al. further teach providing the diamond-like material comprising from about 0.1 atom % to about 10 atom % of a metal additive, whereby the metal additive changes the resistivity of the coating, which is from about 10^4 ohm·cm to about 10^8 ohm·cm, thus, further optimizing the diamond-like carbon coating (Figures 1A-C and 2; column 4, row 43 through column 5, row 27).

30. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided the diamond-like nanocomposite having networks of (i) carbon and hydrogen and (ii) silicon and oxygen as a protective film in order to provide a coating having high strength and microhardness, flexibility, low coefficient of friction, and high thermal and chemical stability and to have also provided metal additive in order to change the resistivity of the coating and thus allow for further optimization of the coating as taught by Dorfman et al.

31. With respect to the process by which the DLC layer with metal additive is deposited (e.g. claim 20), Dorfman et al. disclose a method wherein the diamond-like material is co-deposited with a metal additive by a process of combining physical vapor deposition (PVD) of the metal additive in a plasma enhanced chemical vapor deposition (PECVD) environment (column 5, row 57 through column 6, row 37). However, it is also noted that courts have ruled "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself.

The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Response to Arguments

32. Applicant's arguments with respect to claims 5-6, 12, 14-16, 18-20, 58 and 61-63 have been considered but are moot in view of the new ground(s) of rejection.
33. Larsen et al. is relied upon in addition to the previously relied upon prior art in order to address newly added claim limitations, as well as to even more clearly point out the obviousness of the claimed invention to one of ordinary skill in the art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KARLA MOORE whose telephone number is (571)272-1440. The examiner can normally be reached on Monday-Friday, 9:00 am-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571.272.1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1792

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Karla Moore/
Primary Examiner, Art Unit 1792
29 September 2008